

# Lesson Plan

## Clearing the Air

### Grade Level

- K-3
- 4-6

### Main Ideas

- Air is an invisible but tangible substance that enters our bodies every day.
- Air is an essential part of nature's life support system because all living things depend on it to survive.
- Pollution is a harmful substance that can enter the air and change the way it looks and/or smells.
- Environmental scientists are men and women who work to keep the air clean.

### Objectives

Students will (1) learn to recognize air as an actual substance rather than "blank space" and (2) come to understand why clean air is important. They will also learn to (3) recognize signs of pollution in the air and (4) be aware of some of the adverse effects that air pollution can cause. They will also (5) learn how both simple steps and science can be used to keep our air clean.

### Materials Needed

- Lemon and blueberry dry powdered drink mix
- squeezable water bottle
- 4 large sheets of paper
- 4 clean 1-gallon milk jugs filled with water
- Index cards (enough for every student)
- Petroleum jelly
- Overhead projector
- Drinking straws (enough for every student)
- [Environmental Careers at IDEM handout](#)
- String
- Hole puncher

#### *Grades K-3 only*

- The Lorax, by Dr. Suess

#### *Grades 4-8 only*

- [Large Dirty 6 Cards](#)
- Small Dirty 6 Cards
- Dirty 6 Overheads Error! Bookmark not defined.
- ["Lungs" for the Dirty Six Vest Activity](#)

### In this lesson...

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## Teacher Preparation

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**For use when a teacher is giving the presentation on his or her own**

### Overview

This presentation is designed to help students recognize the importance of clean air, and understand what can be done to improve the quality of our air.

### Materials Needed

The following items should be gathered before beginning the presentation.

- Lemon and blueberry powdered drink mix
- 1 squeezable water bottle
- 4 large sheets of paper
- 4 clean 1-gallon milk jugs filled with water
- Overhead projector
- Drinking straws (1 per student)

Further, the following materials should be prepared and used prior to the presentation. (See Pre-presentation Activity for instructions)

- Index cards (1 per student)
- Petroleum jelly
- String (enough for everyone to get a 6-8 inch piece)
- Hole puncher

### Additional Resources

Check out the "[Taking it further](#)" section for other activities that can help you integrate this presentation into a larger lesson plan or thematic unit, follow-up the presentation with more activities, or simply give you ideas for future lesson plans.

The Indiana State Science Standards covered in this program have also been provided for you, allowing you to cover the standards with an environmental twist. Furthermore, a glossary of terms covered in the presentation is provided with definitions.

## **Pre-Presentation Activity (to be done 2-3 days prior to presentation)**

### **Particulate Matter demonstration for the entire class**

**Purpose:** To demonstrate to students that particulate matter exists in their environment, despite the fact that they usually cannot see or taste it.

**Materials:** Index cards, petroleum jelly, hole puncher, string

**Instructions:**

Have each student punch a hole in their index card and tie their string through the hole, as to easily hang it from some object in the room. Next, each student should coat his or her index card in petroleum jelly to "catch" the particulate matter. Finally, have each student pick a place to hang his or her card where it can remain undisturbed for the next two or three days.

**Discussion/Follow-up:** Have the students make predictions about what they will find on their cards. Later they can compare these to the actual results.

## Presenter Preparation

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**For IDEM staff members giving the presentation**

### Overview

This presentation is designed to help students recognize the importance of clean air, and understand what can be done to improve the quality of our air.

### Materials Needed

You should prepare the materials you are to bring prior to your presentation. Contact Chad Trinkle at (317) 233-9479 with any questions you may have regarding where to find them or how to use them.

- [Environmental Careers at IDEM handout](#)
- The Lorax, by Dr. Seuss (grades K-3 only)
- [Large Dirty Six Cards](#) (grades 4-8 only)
- Small Dirty Six Cards (grades 4-8 only)
- ["Lungs" for the Dirty Six Vest Activity](#) (grades 4-8 only)
- Dirty 6 Overheads (grades 4-8 only)

Remind the teacher you are presenting for to prepare his or her materials ahead of time and to complete the pre-presentation activity on particulate matter.

### Presentation Tips

- Read through the presentation beforehand to become comfortable with the information presented and to identify any alterations you want to make.
- The outlined presentation is merely a rough guideline. You are not expected to get through all the information available; feel free to pick and choose which parts to present based on time constrictions, your personal preferences, and age of your audience.
- Younger audiences are more likely to get restless, so be sure to keep them entertained.
- Provide positive feedback to your students as you go. Be sure to smile at them and encourage them to participate.
- Have fun! Instructor enthusiasm is contagious, especially with small children.

## Lesson & Activities

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### A. Introduction

Air is all around us, but it can not always be detected by human senses. There are many ways that air can affect peoples' lives. Everyone must understand how important it is for the air to be clean and healthy and do everything possible to keep it that way.

Each day children breathe about 35 pounds of air - about the weight of an average dog or small TV. That's over 20,000 breaths!

#### Activity # 1

##### **Weight of the Air Demonstration for 2-4 volunteers**

**Purpose:** To demonstrate how heavy a child's daily intake of air is.

**Materials:** 4 1-gallon milk jugs filled with water

**Instructions:**

Explain that the four one-gallon milk jugs that have been filled with water represent the amount of air breathed by one child in one day. One at a time, allow volunteers to try lifting all of the jugs.

**Discussion/ Follow-up:** Ask students if they had any idea that air could weigh so much, and if or how this makes them think of the air in a different way.

## **B. The Importance of Clean Air:**

*Many of us never think about the air we breathe, but we could not live without it.*

All life on Earth depends on air to survive. Humans can survive only a few minutes without breathing it. Plants and animals also depend on clean air to survive and humans depend on plants and animals for food. When this air becomes polluted and dirty, all living things suffer.

### **Activity #2**

#### **Air Pollution Demonstration for approximately 6 volunteers**

**Purpose:** To help the students understand that both visible and invisible pollution can have effects on people.

**Materials:** Lemon and blueberry drink mix, squeezable water bottle, 4 large sheets of paper

#### **Instructions:**

Put large sheets of paper on the floor or table where the students will be making "pollution." Have squeezable water bottle filled with dry lemon drink mix ready. Let students take turns shaking the closed water bottle. Open the spout and help them squirt the bottle as hard as they can straight into the air. Repeat the activity, only the second time use the blueberry mix.

**Discussion/Follow-Up:** Explain that the water bottle is like a smokestack, and that the lemon color is hard to see just like some pollution. Make sure the students notice that the blueberry color is much easier to see, but isn't really any different than the lemon colored pollution.

## **C. What Air Pollution Looks Like**

Can anyone tell me what air pollution looks like? Has anyone ever seen smoke coming from the back of a car or a smokestack from a building? Have you seen a burning building or burning leaves? What did you see? Could you smell the smoke? How did it make you feel?

Power plants that make electricity so that people can turn on their lights can make lots of pollution. So do cars and trucks. Factories that make things can also make pollution. Sometimes air pollution can be easy to detect. Smoke is almost always a sign of air pollution. If the smoke is white, it may just be steam, but if the smoke is colored yellowish, orangish, gray, brown or black, it is air pollution.

Other times, air pollution is not so easy to spot. The bits of air pollution can be so small that people cannot see them with their eyes. Scientists must use other ways, like taking tests, to find out if there is pollution in the air. Even invisible pollution is harmful.

## **D. Air Pollution in Indiana**

### **Grades K-3**

There are six main pollutants that have been identified by environmental scientists. These pollutants can get into people's lungs and make them very sick. Many cause problems like asthma, and eye irritation while others lower immune systems making it easier to catch colds and other sicknesses.

#### **Activity #3**

**A reading of the classic children's book, "The Lorax"**

**Purpose:** To teach children about the adverse health effects of pollution using a medium that they can understand.

**Materials:** The Lorax, by Dr. Seuss

**Instructions:**

Read the book to the class. Identify and discuss the problems the Lorax had with pollution.

**Discussion/Follow-up:** Discuss with children how the smogulous smoke produced by the THNEEDS factory made the Lorax cough, whiff, sneeze, snuff, snarggle, and croak. Talk with students about air pollution produced by cars and other machinery with gas burning engines, as well as emissions produced by furnaces, fireplaces, factories, and incinerators. Ask the students what they thought of the story and if they have ever felt like a Bar-ba-loot. Explain to them that polluted air can make people get sick, just like the characters in the story.

### **Grades 4-8**

There are six main pollutants that have been found to be very harmful to the health of people, plants, and animals.

They can make people very sick with problems like asthma. Asthma can cause tubes in the lungs to contract like a cramp only longer. This makes breathing difficult and painful. Sometimes when someone has an asthma attack the person must go to the hospital for breathing treatments.

#### **Activity #4**

**A Breathing Demonstration for the whole class**

**Purpose:** To demonstrate to students what it feels like to have breathing problems.

**Materials:** Drinking straws (1 per student)

**Instructions:**

Provide each student with one drinking straw. Have each student breathe through the straw as their only means of air intake for ten seconds. Use the "Dirty Six" overheads to continue discussion.

**Discussion/Follow-up:** Continue following script into "dirty six" activity and discussion.

Environmental scientists have identified these six pollutants as the ones that need to be watched most carefully. These pollutants can get into people's lungs and make them very sick. Many cause problems like asthma and eye irritation while others lower immune systems making it easier to catch colds and other sicknesses.

## Activity #5

### "Dirty Six" Demonstration for 7 volunteers

**Purpose:** To help children understand the causes and harms of the six main pollutants in our environment.

**Materials:** [Large Dirty 6 cards](#), Small Dirty 6 cards, ["Lungs" for the Dirty Six Vest Activity](#)

#### **Instructions:**

Give six volunteers a large dirty 6 card turned face down. Place a male volunteer in the lung vest. Have the volunteers turn their cards face up as you talk about each pollutant. Place the smaller versions of each card on the lung vest as you speak about them.

**Discussion/Follow-up:** Continue to discuss the pollutants, tying each one to their health effects.

#### **These are the dirty six:**

1. **Carbon Monoxide** is an odorless, tasteless gas that results from unburned fossil fuels like coal, oil, wood, gasoline and natural gas. Internal combustion engines such as in a car or machinery, furnaces and forest fires all produce carbon monoxide.  
**Harms:** This pollutant reduces the ability of blood to absorb oxygen in the body cells and tissues. It can cause headaches, fatigue, impaired vision and worse.
2. **Ozone** is a combination of certain polluting gases that are cooked by the sun on hot days. The pollutants that form ozone come from cars, factories, landfills, oil products, lawn equipment, paints, gas stations and so on.  
**Harms:** Health damage from ozone can irritate the lungs and make it difficult to take a deep breath. It can cause eye irritation, chest pain, coughing, and lung problems. Ozone damages trees and plants, reducing crop yields and reducing food sources. It also damages rubber and fabrics.
3. **Particulate Matter** is solids or liquids from smoke, soot, rubber, small bits of metal, fly ash, and condensing vapors or gases that can remain suspended in the air for a long time. Burning wood, leaves, diesel, and oil produces particulate matter. Dust from roads, construction and some farm activities also cause this pollutant. Burning fields and yard wastes such a leaves, windstorms, forest fires and volcanoes can all form particulate matter.  
**Harms:** Particulate matter affects breathing and respiratory systems, it causes increased lung damage, and can cause coughing and throat irritations. Some particulate matter can carry cancer-causing materials and heavy metals that are especially harmful to children and older people. It can cause our cities to be dirty and damage surfaces of buildings, statues and cars. Particulate matter can also reduce visibility.
4. **Nitrogen Oxide** is an orange to light brown gas at low concentrations. It is a major component of smog. It is produced by burning fuels (gasoline, natural gas, coal, oil) at high temperatures.  
**Harms:** It irritates lungs, especially in people who already have lung problems. It can be irritating to eyes, nose throat and skin. It can lower our resistance to flu, colds, and other lung diseases and is fatal in high concentrations!  
Nitrogen oxide is an ingredient of acid rain that can harm plants, wildlife and lakes. In high concentrations it can poison plants, cause plants to grow at the wrong times and eat away stone used in buildings and statues. It can also damage eggs of fish and amphibians during the spring and reduce visibility.



5. **Lead** is a solid metal that becomes airborne as a particulate in the air. It is easy to mold or form and was commonly used in ceramics, paints and water pipes and systems before it was known to be harmful to human life. It is found in lead batteries, metals and can float around as dust.

**Harms:** Lead reduces the body's ability to form blood and impacts our nervous system and kidney systems. It can cause brain damage, build up in bones and other tissues that cause long-term health problems long after the exposure has ended. It can cause children to become hyperactive and reduce a child's learning ability. Soil contaminated by lead can affect plants and animals living in or on the land.

6. **Sulfur Dioxide** is a colorless gas formed when sulfur burns. When combined with oxygen, it turns into a pollutant. It is a major component of acid rain. When fuels that contain sulfur, including coal and oil, are burned in the home, industrial furnaces, oil refineries, and at power plants sulfur dioxide is made.

**Harms:** It can constrict breathing passages, irritate lungs, eyes and skin, increase health problems of people with lung and respiratory problems and can cause permanent lung damage. Sulfur dioxide can stunt plant growth and damage food crops and trees. It eats away at monuments, statues and buildings; it corrodes metal and zinc and reduces visibility. When combined with other chemicals in the atmosphere, it can produce acid rain. Since Indiana and many other Midwestern states produce most of their electricity by burning coal, sulfur dioxide and acid rain are major pollutants in Indiana.

Most of the Dirty 6 are invisible, odorless and tasteless, but cities and states are able to measure them by using many different kinds of equipment. There are environmental scientists at IDEM that do just that.

## E. What IDEM Does to Help

### Grades K-3

(Use [Environmental Careers at IDEM handout](#))

Scientists at IDEM in the Office of Air Quality work hard each day to help keep the air clean. Some of them write rules to make laws that help clean the air. Inspectors check to make sure that factories and cars are not making too much pollution. Some scientists tell the public how important it is to keep the air clean and how to create as little pollution as possible.

### Grades 4-8

(Use [Environmental Careers at IDEM handout](#))

There are many different jobs in the Office of Air Quality. Some of these are:

- **Rule Writers:** Write rules and policies that help keep pollution emissions at lower levels.
- **Permit Writers:** Write permits for businesses to pollute within the limits set by the rule writers.
- **Inspectors:** Visit factories to make sure that the companies are not polluting too much.
- **Environmental Scientists:** Observe tests being done on air pollution equipment and check air pollution with monitors that have been placed around the state.
- **Environmental Attorneys:** Review policies, regulations and laws. Some work with companies on important air pollution issues or concerns.

## F. What You Can Do to Help

*There are many ways for people who aren't scientists to help keep the air clean too.*

Since electricity causes a lot of pollution, everyone should turn off the lights, TV's, and video games that aren't being used. This way, the power plants don't have to work as hard to create so much electricity. Sometimes people forget how much electricity they are using to make their house warm in the winter or cold in the summer and leave the door or window open. This lets cold or hot air in the house and uses even more electricity to heat it back up or cool it down again. The less electricity that the power plants need to make the less air pollution they create.

Keeping electricity usage down is an easy way to keep air pollution down, but it is not the only way. Here are a few more ideas:

- Turn off lights, TV, video games or radio/CD player when not in use.
- Shut the doors.
- Shut off the hot water between uses.
- Take showers instead of baths to use less hot water.
- Use cloth rags or towels instead of paper towels.
- Walk or ride bikes with a friend to places you would normally drive.
- Recycle or reuse everything you can. It takes more energy to make new products out of raw materials than to recycle them.

## G. Conclusion

IDEM takes air pollution and your health very seriously. If all the suggestions made were followed, they would make a huge impact on keeping the air clean. That is why it is so important for everyone to think like an environmental scientist even if becoming one is years away!



## Taking it Further

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IDEM's presentations are designed to suit both the environmental scientist with no experience in the classroom and the experienced educator who wants to give his or her students a fresh learning experience.

However, there are a few things that the trained teacher can offer that are not possible to replicate in a short presentation. This section provides that teacher with additional activities that can be used in place of or in addition to the ones in the lesson.

### Additional Activity #1

#### Matching IDEM Cards

**Purpose:** Students will learn how IDEM staff works to fight air pollution.

**Materials:** Scientist/Program and Pollution matching cards<sup>\*</sup>

**Instructions:**

- **K-3:** Call for some volunteers to represent "scientists and IDEM programs" and more volunteers to represent the pollution. Distribute the first set of cards to the scientists and programs and have them stand in a line in front of the class. Distribute the second set of cards to the pollution card volunteers. Have them find the matching scientist or program that fights the pollution problem on the card they are holding.

**Discussion/Follow up:** You and the teacher(s) should assist the students to find their matching cards relate.

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<sup>\*</sup> Must be obtained from IDEM staff.

## **Additional Activity #2**

### **Traveling Smells**

**Purpose:** To see how invisible substances can affect your body, and to learn how wind affects air pollution.

**Materials:** Folder or paper fan, onion, lemon or vanilla extract, cutting surface, knife

#### **Instructions:**

- **K-3:** Obtain a folder or make a fan from folded paper. Slice up a lemon or onion or open the vanilla extract and fan it in different directions around the classroom. Have students raise their hands, as they smell the lemon, vanilla or onion odors. As the hands begin to rise, tell the students how that relates to air pollution. Just as the lemon smell is moving through the classroom, air pollution moves through the air. When we breathe in air pollution, it can harm our lungs and make us sick. That is why IDEM scientists work hard to reduce air pollution and why we all need to do everything we can to help.
- **4-8:** Follow the K-3 procedures for cutting and fanning the onion/lemon or vanilla. Have three students volunteer to be scientists. Each of the remaining students will act as monitoring instruments that IDEM uses to measure air pollution in different parts of a city. Each "instrument" should raise a hand the instant he/she smells the onion or lemon. One scientist (or teacher for younger levels) should be prepared to draw on the chalkboard a rough map of the smell's path through the "city." One scientist should measure the time between the first and last hand raised and how long it takes for the odor to disappear. The last scientist should count the number of people whose eyes water - onion only.

**Discussion/Follow-Up:** Explain that just as the path of these "smells & gases" traveled through the classroom city, gases from air pollution affect each of us outside by pollution traveling through the air.

### Additional Activity #3<sup>1</sup>

#### Ollie the Air Molecule

**Purpose:** To teach students about oxygen molecules by having them move from place to place in the air, for example, from plants to smog and from an industrial scrubber into the human body, to demonstrate how easy it is for pollutants to move around in our air.

**Materials:** 8 different colors of beads, 8 large pieces of paper, marking pens, 8 boxes about 6 inches on each side, pieces of pre-cut string

#### **Instructions:**

There are many different places that oxygen molecules can move to, but this activity focuses on eight stops the molecule might make as it travels through the air. Air molecules can move to any location at anytime and in no order.

1. Label the boxes for each station (all 6 sides): carbon monoxide, sulfur dioxide, oxygen, lead, nitrogen oxide, smog, carbon dioxide, particle matter, ozone. (See chart for labeling instructions.)
2. Find a large open area.
3. Take the large pieces of paper and make signs for each station that labels what type of air pollution is being represented.
4. Place the signs around the area in any order.
5. Place the correct color of beads at the station and place a die at the station. Give the children a piece of the string and tell them what station they will be starting at. Once the children are at the stations, explain to them what they will be doing and to follow what the die says. If they roll a "stay," they have to stay at that station until they roll something else, picking up that bead how ever many times they stay at that station. Tell the children that they will put the beads on the string to make a bracelet. When they have eight beads on their bracelet, they are finished. After each student has completed eight rolls of the dice, have them pick one color to finish the bracelet off. Tie the two ends together to make a bracelet.

**Discussion/Follow-Up:** Discuss what each of the various stations represent and explain to the students what all these items are. For a brief description of each station, see below. You can also make copies of this page to hand out to the students. This activity is designed to show children how the air that we breathe can be contaminated with pollutants that are dangerous to our health. It also shows them what we are putting into our air and how it can negatively effect the environment in which we live.

The 8 stations include:

- Carbon Monoxide- white beads
- Sulfur Dioxide- blue beads
- Oxygen- body- clear beads
- Lead- gray beads
- Nitrogen Oxide- purple beads
- Carbon Dioxide- plants- green beads
- Particle Matter- brown beads
- Ozone- black beads

<sup>1</sup> Adapted from Project WET page 161.

Station	Die Side Labels
<b>Sulfur Dioxide</b>	One side Oxygen One side Lead One side Nitrogen Oxide Two sides Carbon Dioxide One side stay
<b>Oxygen</b>	Four sides Ozone Two sides stay
<b>Ozone</b>	One side Lead One side Particulate Matter One side Carbon Monoxide One side Sulfur Dioxide One side Ozone One side stay
<b>Nitrogen Oxide</b>	One side Ozone One side Sulfur Dioxide One side Carbon Monoxide One side Oxygen One side stay
<b>Carbon Monoxide</b>	Two sides Particulate Matter Four sides stay
<b>Lead</b>	One side Nitrogen Oxide One side Lead One side Carbon Dioxide One side Oxygen Two sides stay
<b>Particulate Matter</b>	One side Carbon Monoxide One side Lead One side Sulfur Dioxide Three sides stay
<b>Carbon Dioxide</b>	One side Oxygen Two sides Particulate matter Three sides stay

## Indiana State Science Standards Covered in this Presentation (K-6)

### Kindergarten

#### Scientific Inquiry

- K.1.1 Raise questions about the natural world.
- K.1.2 Begin to demonstrate that everyone can do science.

#### Models and Scale

- K.6.1 Describe an object by saying how it is similar to or different from another object.

#### Please Note

These Indiana State Science Standards apply only to the [Lesson & Activities](#) section of this lesson plan. They do not apply to the [Taking it Further: Additional Activities](#) section.

### First Grade

#### Scientific Inquiry

- 1.1.2 Investigate and make observations to seek answers to questions about the world, such as "In what ways do animals move?"

#### Communication Skills

- 1.2.6 Describe and compare objects in terms of number, shape, texture, size, weight, color, and motion.

#### Forces of Nature

- 1.3.4 Investigate by observing , and then describe how things move in many different ways, such as straight, zigzag, round-and-round, and back-and-forth.

#### Interdependence of Life

- 1.4.4 Explain that most living things need water, food, and air.

#### Models and Scale

- 1.6.1 Observe and describe that models, such as toys, are like the real things in some ways but different in others.

### Second Grade

#### Shapes and Symbolic Relationships

- 2.5.3 Observe that and describe how changing one thing can cause changes in something else, such as exercise and its effect on heart rate.

#### Models and Scale

- 2.6.2 Observe and explain that models may not be the same size, may be missing some details, or may not be able to do all of the same things as real things.



## Third Grade

### Scientific Inquiry

3.1.2 Participate in different types of guided scientific investigations, such as observing objects and events and collecting specimens for analysis.

3.1.4 Discuss the results of investigations and consider the explanations of others.

### Technology and Science

3.1.6 Give examples of how tools, such as automobiles, computers, and electric motors, have affected the way we live.

### Human Identity

3.4.8 Explain that some things people take into their bodies from the environment can hurt them and give examples of such things.

### Models and Scale

3.6.3 Explain how a model of something is different from the real thing but can be used to learn something about the real thing.

## Fourth Grade

### Technology and Science

4.1.7 Discuss and give examples of how technology, such as computers and medicines, has improved the lives of many people, although the benefits are not equally available to everyone.

### The Earth and the Processes that Shape It

4.3.2. Begin to investigate that air is a substance that surrounds us, takes up space, and whose movements we feel as wind.

## Fifth Grade

### The Scientific Enterprise

5.1.3 Explain that doing science involves many different kinds of work and engages men, women, and children of all ages and backgrounds.

### Technology and Science

5.1.5 Explain that technology extends the ability of people to make positive and/or negative changes in the world.

5.1.6 Explain how the solution to one problem, such as the use of pesticides in agriculture or the use of dumping for waste disposal, may create other problems.

## Sixth Grade

### The Scientific Enterprise

6.1.4 Give examples of employers who hire scientists, such as colleges and universities, businesses and industries, hospitals, and many government agencies.

6.1.5 Identify places where scientists work, including offices, classrooms, laboratories, farms, factories, and natural field settings from space to the ocean floor.

### **Technology and Science**

6.1.8 Describe instances showing that technology cannot always provide successful solutions for problems or fulfill every human need.

### **The Earth and the Processes that Shape It**

6.3.13 Identify, explain, and discuss, some effects human activities, such as the creation of pollution, have on weather and the atmosphere.

6.3.16 Explain that human activities, such as reducing the amount of forest cover, increasing the amount and variety of chemicals in the atmosphere, and farming intensively, have changed the capacity of the environment to support some life forms.

## Glossary of Air Pollution Terms

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### **Air**

A mixture of gases found in the atmosphere around the earth that is comprised of oxygen, nitrogen, hydrogen, carbon dioxide and other trace gases.

### **Asthma**

A disease that is sometimes brought on by allergies. It causes sudden recurring attacks of difficult breathing, chest constriction, and coughing.

### **Dirty Six**

The six main pollutants in our air that can cause serious problems.

(Definitions for each of the six pollutants can be found in the "Dirty six" demonstration activity)

### **Emission**

Pollution discharged into the atmosphere.

### **Environment**

The conditions that surround one; surroundings.

### **Environmental Scientist**

A scientist who studies the environment and works to protect it.

### **Factory**

A building or group of buildings containing equipment for conducting manufacturing processes.

### **Pollutant**

A waste material that contaminates air, soil, or water.

## Additional Presentation Materials

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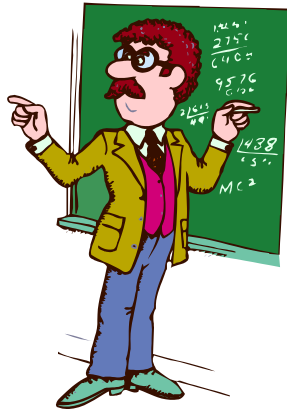
- Environmental Careers at IDEM Handout
- Large "Dirty Six" Cards
- "Lungs" for the Dirty Six Vest Activity

## Environmental Careers at IDEM

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- Inspector



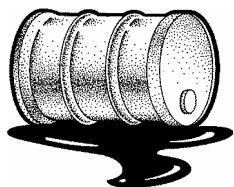
- Env. Ed. Specialist



- Geologist
- Toxicologist
- Biologist
- Engineer
- Chemist



- Commissioner



- Rule Writer
- Permit Writer











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